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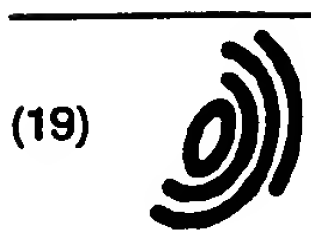
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(54) **Interactive gaming system**

(57) An interactive gaming and audiovisual transmission system comprising a central gaming computer 4002 for processing gaming data, a decoder 2020 adapted to receive gaming data from the central gaming computer 4002 together with transmitted audiovisual data, the decoder further including a card reading device for interacting with a user's bank card in order to credit a gaming account held by the central gaming computer means in response to a transfer of credit from the user's bank account.

Fig.4.
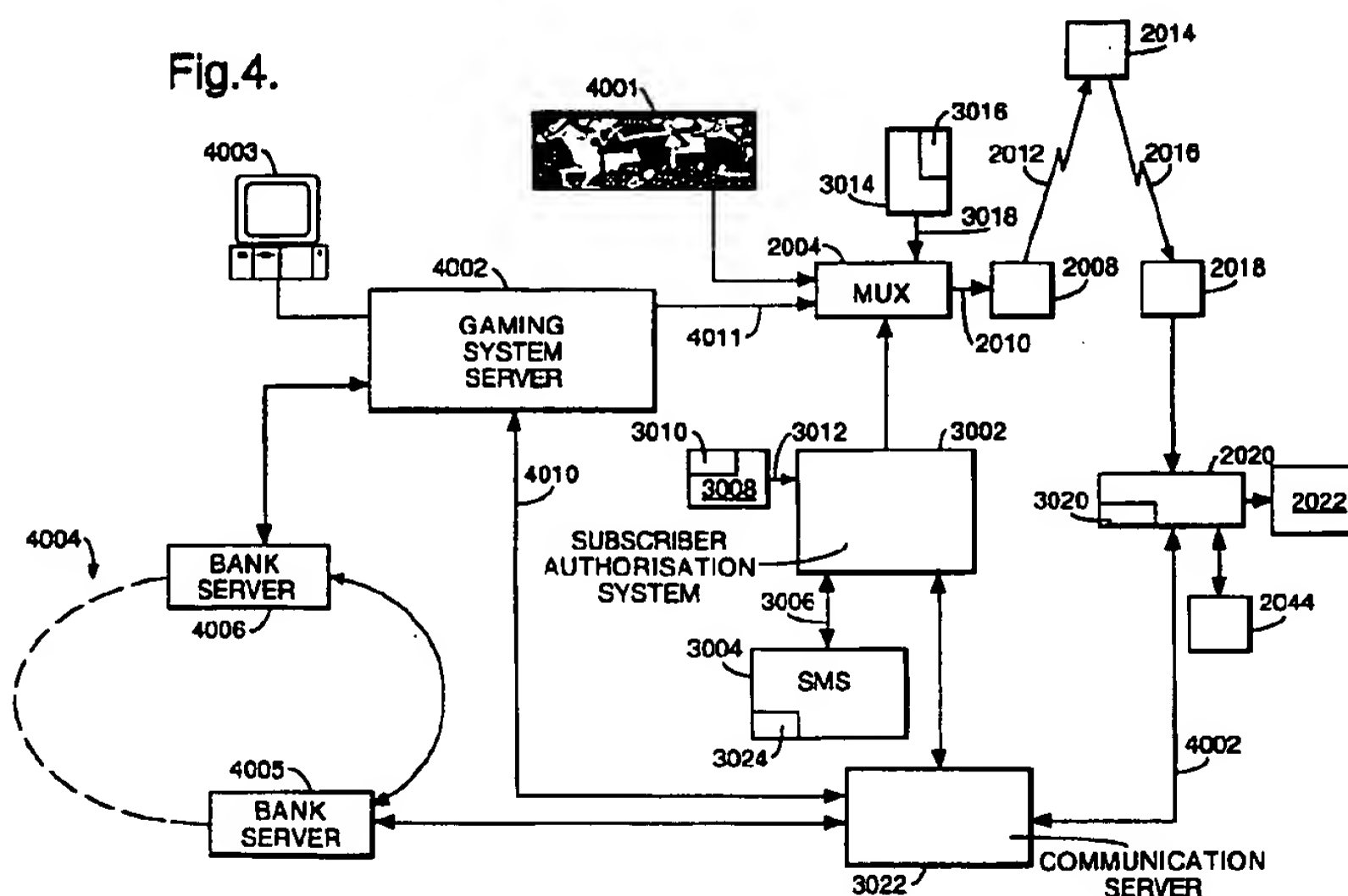
EP 0 934 765 A1

Description

[0001] The present invention relates to an interactive gaming and digital audiovisual transmissi n system, in particular a gaming and digital t levision transmission system.

[0002] Broadcast transmission of digital data is well-known in the field of pay TV systems, where scrambled audiovisual Information is sent, usually by a satellite or satellite/cable link, to a number of subscribers, each possessing a decoder capable of descrambling the transmitted program for subsequent viewing. Terrestrial digital broadcast systems are also known. Recent systems have also used the broadcast link to transmit other data, in addition to or as well as audiovisual data, such as computer programs or interactive applications to the decoder or to a connected PC.

[0003] The increasing sophistication of such technology, in particular in relation to the receiver/decoder devices used in the systems, has led to an increase in the possible services that may be provided thereby. In particular, a number of systems have been proposed using interactive technology to enable a viewer to, for example, participate in a quiz show, or to select further information regarding a product currently being displayed on a shopping channel.

[0004] In the case of gaming applications, a number of largely theoretical systems have been proposed to enable a viewer to gamble a sum of money on the outcome of a sporting event or casino-type game broadcast over a television network. In most of these systems, a viewer is usually obliged to open an initial account with the controlling gaming authority by phoning or mailing a money transfer to the gaming authority before any gambling can be carried out. The disadvantages of this sort of procedure will be apparent.

[0005] Alternative systems are also known, in which the viewer buys credits to be gambled in the form of an electronic purse, i.e. a smart card or the like, the credits in the purse being available for subsequent gaming operations. The card is inserted in the decoder and the credits used thereafter in the subsequent gaming operations. When the contents of the purse are exhausted, the viewer buys a new card or re-charges the card at a suitable sales point. This system again implies a certain infra-structure to be put in place to enable a user to obtain the necessary credits to be gambled.

[0006] The present invention seeks to overcome some or all of the disadvantages of these prior art systems.

[0007] According to the present invention, there is provided an interactive gaming and audiovisual transmission system comprising a central gaming computer means for processing gaming data, a decoder adapted to receive gaming data from the central gaming computer together with transmitted audiovisual data, the decoder further including a card reading device for interacting with a user's bank card in order to credit a gaming account held by the central gaming computer means in response to a transfer of credit from the user's bank account.

[0008] In this way, the present invention enables a user t simply and quickly open and credit a gaming account from th comfort f his home, avoiding th more elaborate payment methods of the known systems.

[0009] The type of bank card used in this transaction may be of the debit or credit type. The card reading device may in particular comprise a smart card reader adapted to interact with a bank card in the form of a smart card.

[0010] Advantageously, the decoder is further equipped with a second card reading device. For example, in the case where the decoder forms part of a television subscription service, the subscriber may be provided with a subscription card in the form of a smart card or the like. The provision of two card reader devices in the decoder permits the decoder to carry out credit transactions on a bank card inserted in one reader whilst the subscription card is held in the second reader.

[0011] In one realisation, the decoder may be adapted to obtain transfer of credit information in the form of an electronic certificate generated by the bank card in response to transaction data submitted by the decoder. This transaction information may include, for example, the details of the bank account of the gaming authority to be credited in the operation, the sum of money to be transferred etc.

[0012] Typically, data is entered by the user into the decoder using a handheld remote control. In the case where a credit transaction is to be carried out, it may be necessary to enter the bank card PIN number using the remote control. In one embodiment, the decoder is provided with a handheld remote control, some or all of the data sent to the decoder being encrypted by the handheld remote control and subsequently decrypted by the decoder. In this way, interception by third parties of sensitive data emitted by the remote control may be avoided.

[0013] Preferably, the decoder is adapted to transmit transfer of credit information from the decoder to a bank server via a network communication link, for example, using an modem integrated in the decoder.

[0014] The decoder may be adapted to directly communicate transfer of credit information to a bank computer. However, preferably, the system further comprises an intermediate communications server, adapted to receive transfer of credit information communicated from the decoder and to forward this information on to a bank server.

[0015] The intermediate communications server may further be adapted to communicate with the central gaming computer means, for example, to inform the central communication means of a transfer of credit instruction being forwarded from the intermediate communication means to a bank computer, so as to permit

the gaming computer means to set up an account without having to verify the transaction carried out at an associated bank server.

[0016] The central gaming computer means may equally be adapted to receive and transmit credit information to or from a bank server via a network communication link. This may be necessary, for example, in the case of a win or in order to verify the transfer of funds from the bank account of a user to the gaming authorities bank account before opening a gaming account.

[0017] Preferably, the decoder is adapted to communicate gaming information to the central gaming computer during gaming operation via a network communication link. This may be the same link as used to communicate transfer of credit information to a bank computer, for example, using a modem device integrated in the decoder.

[0018] Some or all of the gaming information communicated from the decoder to the central gaming computer during gaming operation may be encrypted by the decoder. For example, the decoder may be adapted to transmit in encrypted form a code word entered by the user associated with the gaming account of the user held by the central gaming computer.

[0019] The decoder may be adapted to directly communicate information to the central gaming computer during gaming operation. However, preferably, the system further comprises an intermediate communications server, adapted to receive information communicated from the decoder during gaming operation and to forward this information on to the central gaming computer. This may be the same intermediate server as used for the transfer of credit information between the decoder and a bank.

[0020] In the case where gaming information is encrypted by the decoder, the intermediate communications server may be adapted to simply pass this information "as is" to the central gaming computer. However, in one embodiment, the intermediate communications server is adapted to decrypt information received from the decoder and to re-crypt this information for subsequent communication to the central gaming computer. This may be required, for example, in the case where different encryption algorithms are used by the decoder and central gaming computer.

[0021] The intermediate communications server may further be adapted to communicate information to and from other computer devices, for example, computer databases holding TV subscriber information. In this way, the intermediate communications server may obtain directly information regarding the user of the system (name, address etc) to be used in setting up a gaming account, without the user having to re-enter the same information.

[0022] The communication means used to transmit gaming data from the central gaming computer to the decoder may be defined in a number of different ways and by a number of different communication elements.

For exampl , some or all of the gaming data sent from the gaming computer to the decoder may be transmitted via a transmitter means used to transmit audiovisual data to the decoder.

[0023] In addition, or alternatively, some r all of the gaming data sent from the central gaming computer to the decoder may be sent via a network communication link, for example, the same network used to communicate information from the decoder to the central gaming computer during gaming operation.

[0024] In practice, a mixture of these two communication paths may prove optimal, the network path being used for rapid dialogue between the decoder and the gaming computer during real-time operation and the transmission path being used for relatively fixed data, such as screen format display data or the like.

[0025] The present invention also extends to a gaming system for processing gaming data, comprising:

means for transmitting gaming data to a user's decoder;

means for receiving data from the user's decoder; and

means for connection to a bank server holding the user's bank account in order to transfer credit to or from the account.

[0026] The gaming system may include a gaming account held by the gaming system which can be credited in response to the transfer of credit.

[0027] The gaming system may be adapted to communicate with the decoder and the bank server via a communications server. If so, the gaming system may be adapted to receive encrypted information from the communications server.

[0028] The present invention also provides a interactive gaming and audiovisual transmission system comprising a gaming system as aforementioned, said user's decoder, and said bank server.

[0029] As mentioned above the system may be used to permit gaming in relation to various events. For example, the central gaming computer may be adapted to generate a computer game (computer blackjack or the like), the computer generated images being transmitted via the audiovisual link to the decoder.

[0030] However, as will be appreciated, the combination of gaming and audiovisual systems makes the present invention particularly adapted to permit gaming in relation to televised sports, such as horse racing or the like. In one embodiment, the present invention comprises a central gaming computer adapted to provide gaming data related to a real-time sporting event, the decoder being adapted to receive both gaming data and associated audiovisual data of the event.

[0031] In the context of the present application the term ((audiovisual transmission system)) refers to all transmission systems for transmitting or broadcasting primarily audiovisual or multimedia digital data. The

present invention is particularly, but not exclusively, applicable to a broadcast digital television system.

[0032]   In this application the term 《 smart card 》 is used to mean any conv ntional chip-based card device possessing, for example, microprocessor and/or memory storage. Also included in this term are chip devices having alternative physical forms, for example key-shaped devices such as are often used in TV decoder systems.

[0033]   In the present application, the term "decoder" is used to apply to an integrated receiver/decoder for receiving and decrypting an encrypted transmission, the receiver and decoder elements of such a system as considered separately, as well as to a receiver capable of receiving non-encrypted broadcasts. The term equally covers decoders including additional functions, such as web browsers, together with decoder systems integrated with other devices, for example, integrated VHS/decoder devices or the like.

Figure 1 shows the overall architecture of a digital television system, as may be incorporated in the gaming system of the present invention;

Figure 2 shows the conditional access system of the television system of Figure 1;

Figure 3 shows the structure of the decoder of Figures 1 and 2;

Figure 4 shows a gaming system incorporating the television system of Figures 1 and 2; and

Figure 5 shows a flow diagram of the logical steps involved in a gaming transaction

Digital Television System

[0034]   An overview of a digital television broadcast and reception system 1000 adaptable to the present invention is shown in Figure 1. The system includes a mostly conventional digital television system 2000, which uses the known MPEG-2 compression system to transmit compressed digital signals. In more detail, the MPEG-2 compressor 2002 in a broadcast centre receives a digital signal stream (typically a stream of video signals). The compressor 2002 is connected to a multiplexer and scrambler 2004 by linkage 2006. The multiplexer 2004 receives a plurality of further input signals, assembles one or more transport streams and transmits compressed digital signals to a transmitter 2008 of the broadcast centre via linkage 2010, which can of course take a wide variety of forms including telecom links.

[0035]   The transmitter 2008 transmits electromagnetic signals via uplink 2012 towards a satellite transponder 2014, where they are electronically processed and broadcast via notional downlink 2016 to earth receiver 2018, conventionally in th form of a dish owned or rented by the end user. The signals received by receiver 2018 are transmitted to an integrated receiver/decoder 2020 owned or rented by the end user and connected to the end user's television 2022. The receiver/decoder 2020 decodes the compressed MPEG-2 signal into a television signal for the television set 2022.

[0036]   A conditional access system 3000 is connected to the multiplexer 2004 and the receiver/decoder 2020, and is located partly in the broadcast centre and partly in the decoder. It enables the end user to access digital television broadcasts from one or more broadcast suppliers. A smart card, capable of decrypting messages relating to commercial offers (that is, on or several television programmes sold by the broadcast supplier), can be inserted into the receiver/decoder 2020. Using the decoder 2020 and smart card, the end user may purchase events in either a subscription mode or a pay-per-view-mode.

[0037]   An interactive system 4000, also connected to the multiplexer 2004 and the receiver/decoder 2020 and again located partly in the broadcast and partly in the decoder, enables the end user to interact with various applications via a modemmed back channel 4002. Such interactive applications may include an interactive shopping service, a quiz application, an interactive programme guide etc.

[0038]   In point of fact, whilst the interactive system 4000 has been represented as a discrete logical block, the physical elements of this system, such as the server or servers used to handle communications between the receiver/decoder and central servers, may be elements shared with the conditional access system 3000. This will become clear in the description of the gaming system of Figure 4.

Conditional Access System

[0039]   With reference to Figure 2, the conditional access system 3000 includes a Subscriber Authorization System (SAS) 3002. The SAS 3002 is connected to one or more Subscriber Management Systems (SMS) 3004, one SMS for each broadcast supplier, by a respective TCP-IP link 3006 (although other types of linkage could alternatively be used). Alternatively, one SMS could be shared between two broadcast suppliers, or one supplier could use two SMSs, and so on.

[0040]   First encrypting units in the form of ciphering units 3008 utilising 《 mother 》 smart cards 3010 are connected to the SAS by linkage 3012. Second encrypting units again in the form of ciphering units 3014 utilising mother smart cards 3016 are connected to the multiplexer 2004 by linkage 3018. The receiver/decoder 2020 receives a 《 daughter 》 smart card 3020. It is connected directly to the SAS 3002 by Communications Servers 3022 via the modemmed back channel 4002. The SAS sends amongst other things subscription

rights to the daughter smart card n request.

[0041] The smart cards contain the secrets of one or more commercial operators. The ((mother)) smart card encrypts different kinds of messages and the ((daughter)) smart cards decrypt the messages, if they have the rights to do so.

[0042] The first and second ciphering units 3008 and 3014 comprise a rack, an electronic VME card with software stored on an EEPROM, up to 20 electronic cards and one smart card 3010 and 3016 respectively, for each electronic card, one (card 3016) for encrypting the ECMs and one (card 3010) for encrypting the EMMS.

[0043] Also shown in Figure 2 is a handheld remote control used by the viewer to control and program functions of the receiver/decoder 2020.

Multiplexer and Scrambler

[0044] With reference to Figures 1 and 2, in the broadcast centre, the digital video signal is first compressed (or bit rate reduced), using the MPEG-2 compressor 2002. This compressed signal is then transmitted to the multiplexer and scrambler 2004 via the linkage 2006 in order to be multiplexed with other data, such as other compressed data.

[0045] The scrambler generates a control word CW used in the scrambling process and included in the MPEG-2 stream in the multiplexer 2004. The control word CW is generated internally and enables the end user's integrated receiver/decoder 2020 to descramble the programme. Access criteria, indicating how the programme is commercialised, are also added to the MPEG-2 stream. The programme may be commercialised in either one of a number of ((subscription)) modes and/or one of a number of ((Pay Per View)) (PPV) modes or events.

[0046] In the subscription mode, the end user subscribes to one or more commercial offers, of ((bouquets)), thus getting the rights to watch every channel inside those bouquets. In the preferred embodiment, up to 960 commercial offers may be selected from a bouquet of channels. In the Pay Per View mode, the end user is provided with the capability to purchase events as he wishes. This can be achieved by either pre-booking the event in advance (((pre-book mode))), or by purchasing the event as soon as it is broadcast (((impulse mode))).

[0047] Both the control word CW and the access criteria are used to build an Entitlement Control Message (ECM); this is a message sent in relation with a scrambled program. The message contains a control word (which allows for the descrambling of the program) and the access criteria of the broadcast program. The access criteria and control word are transmitted to the second encrypting unit 3014 via the linkage 3018. In this unit an ECM is generated, encrypted with an exploitation key Cex and transmitted on t the multiplexer and scrambler 2004.

Programme Transmission

[0048] The multiplexer 2004 receives encrypted EMMs from the SAS 3002, encrypted ECMs from the second encrypting unit 3014 and compressed programmes from the compressor 2002. The multiplexer 2004 scrambles the programmes and communicates the scrambled programmes, the encrypted EMM (if present) and the encrypted ECMs to a transmitter 2008 of the broadcast centre via linkage 2010. The transmitter 2008 transmits electromagnetic signals towards the satellite transponder 2014 via uplink 2012.

Programme Reception

[0049] The satellite transponder 2014 receives and processes the electromagnetic signals transmitted by the transmitter 2008 and transmits the signals on to the earth receiver 2018, conventionally in the form of a dish owned or rented by the end user, via downlink 2016. The signals received by receiver 2018 are transmitted to the integrated receiver/decoder 2020 owned or rented by the end user and connected to the end user's television set 2022. The receiver/decoder 2020 demultiplexes the signals to obtain scrambled programmes with encrypted EMMs and encrypted ECMs.

[0050] If the programme is not scrambled the receiver/decoder 2020 decompresses the data and transforms the signal into a video signal for transmission to television set 2022.

[0051] If the programme is scrambled, the receiver/decoder 2020 extracts the corresponding ECM from the MPEG-2 stream and passes the ECM to the ((daughter)) smart card 3020 of the end user. This slots into a housing in the receiver/decoder 2020. The daughter smart card 3020 controls whether the end user has the right to decrypt the ECM and to access the programme. If not, a negative status is passed to the receiver/decoder 2020 to indicate that the programme cannot be descrambled. If the end user does have the rights, the ECM is decrypted and the control word extracted. The decoder 2020 can then descramble the programme using this control word. The MPEG-2 stream is decompressed and translated into a video signal for onward transmission to television set 2022.

Subscriber Management System (SMS)

[0052] A Subscriber Management System (SMS) 3004 includes a database 3024 which manages, amongst others, all of the end user files, commercial offers (such as tariffs and promotions), subscriptions, PPV details, and data regarding end user consumption and authorization. The SMS may be physically remote from the SAS

[0053] Each SMS 3004 transmits messages to the SAS 3002 via respective linkage 3006 to enable modifications to or creations of Entitlement Management Mes-

sages (EMMs) t be transmitted to end users.

[0054] The SMS 3004 also transmits messages to the SAS 3002 which imply no modifications or creations of EMMs but imply only a change in an end user's state (relating to the auth rization granted to th end user when ordering products or to the amount that the end user will be charged).

Entitlement Management Messages and Entitlement Control Messages

[0055] ECMs or Entitlement Control Messages are encrypted messages embedded in the data stream of a transmitted program and which contain the control word necessary for descrambling of part or all of a program. Authorisation of a given receiver/decoder is controlled by EMMs or Entitlement Management Messages, transmitted on a less frequent basis and which supply an authorised receiver/decoder with the exploitation key necessary to decode the ECM.

[0056] An EMM is a message dedicated to an individual end user (subscriber), or a group of end users. A group may contain a given number of end users. This organisation as a group aims at optimising the bandwidth; that is, access to one group can permit the reaching of a great number of end users.

[0057] Various specific types of EMM may be used. Individual EMMs are dedicated to individual subscribers, and are typically used in the provision of Pay Per View services. So-called 《 Group 》 subscription EMMs are dedicated to groups, of say, 256 individual users, and are typically used in the administration of some subscription services. This EMM has a group identifier and a subscribers' group bitmap

[0058] For security reasons, the control word CW embedded in an encrypted ECM changes on average every 10 seconds or so. In contrast, the exploitation key Cex used by the receiver to decode the ECM is changed every month or so by means of an EMM. The exploitation key Cex is encrypted using a personalised key corresponding to the identity of the subscriber or group of subscribers recorded on the smart card. If the subscriber is one of those chosen to receive an updated exploitation key Cex, the card will decrypt the message using its personalised key to obtain that month's exploitation key Cex.

[0059] The operation of EMMs and ECMs will be well-known to one skilled in the art and will not be described here in any more detail.

Receiver/Decoder Structure

[0060] Referring to Figure 3, the elements of a receiver/decoder 2020 or set-top box for use in a digital broadcast system and adapted to be used in the present invention will now be described. As will be understood, the elements of this decoder are largely conventional and their implementation will be within the capabilities of on skilled in the art.

[0061] As shown, the decoder 2020 is equipped with several interfaces for receiving and transmitting data, in particular an MPEG tuner and demultiplexer 2040 for receiving broadcast MPEG transmissi ns, a serial interface 2041, a parallel interface 2042, and a modem 2028 for sending and receiving data via the telephone network. In this embodiment, the decoder also includes a first and second smart card reader 2030 and 2031, the first reader 2030 for accepting a subscription smart card containing decryption keys associated with the system and the second reader 2031 for accepting bank and other cards. As will be described, the use of a two-slot decoder, adapted to read bank cards, is an important aspect in the implementation of the gaming system of Figure 4.

[0062] The decoder also includes a receiver 2043 for receiving infra-red control signals from the handset remote control 2044 and a Peritel output for sending audiovisual signals to a television 2022 connected to the decoder. In certain cases it may be desired that the infra-red signals transmitted from the handset 2044 to receiver 2043 are subject to a simple scrambling/descrambling process to ensure that no useful information may be obtained by any third party monitoring the transmission.

[0063] Such algorithms will not be described in any detail, but may comprise, for example a symmetric algorithmic key known to both handset 2044 and receiver/decoder 2020. This may be varied from time to time, for example, by means of a modulating random number chosen by the receiver/decoder 2020 and displayed by the television 2022, the user then programming the handset 2044 with this number to ensure that the handset scrambles entered data using an encryption algorithm key equivalent to that used the receiver/decoder to decrypt the received infra-red signals.

[0064] Processing of digital signals received via the interfaces and generation of digital output signals is handled by a central control unit 2045. The software architecture of the control unit within the decoder may correspond to that used in a known decoder and will not be described here in any detail. It may be based, for example, on a virtual machine interacting via an interface layer with a lower level operating system implemented in the hardware components of the decoder. In terms of the hardware architecture, the decoder will be equipped with a processor, memory elements such as ROM, RAM, FLASH memory etc. as in known decoders.

[0065] Applications processed by the control unit 2045 may be resident applications stored in the ROM or FLASH of the decoder or applications broadcast and downloaded via the MPEG interface 2 of the decoder. Applications can include program guide applications, gam s, interactive services, teleshopping applications, as well as initiating applications to enable the decoder

to be immediately operational upon start-up and applications for configuring the decoder. Applications are stored in memory locations in the decoder and represented as resource files comprising graphic object description files, unit files, variables block files, instruction sequence files, application files, data files etc.

[0066] Conventionally, applications downloaded into the decoder via the broadcast link are divided into modules, each module corresponding to one or more MPEG tables. Each MPEG table may be divided into a number of sections. For data transfer via the serial and parallel ports, modules are also split into tables and sections, the size of the section depending on the channel used.

[0067] In the case of broadcast transmission, modules are transported in the form of data packets within respective types of data stream, for example, the video data stream, the audio data stream, a text data stream. In accordance with MPEG standards each packet is preceded by a Packet Identifier (PID) of 13 bits, one PID for every packet transported in the MPEG stream. A programme map table (PMT) contains a list of the different streams and defines the content of each stream according to the respective PID. A PID may alert the device to the presence of applications in the data stream, the PID being identified by the PMT table.

Gaming System Architecture

[0068] Referring now to Figure 4, there will now be described the elements and functioning of a gaming system according to an embodiment of the present invention. The gaming system includes the elements of the digital television system described and shown in Figures 1 and 2, which have been assigned the same reference numerals . Some elements, such as the digital compressor 2002 shown in Figure 1, have been omitted in order to focus on those aspects of the system which are pertinent to the present invention.

[0069] As shown, the gaming system additionally comprises a source of audiovisual information 4001 regarding the event which will form the subject of betting etc within the system. In the present case, the event has been represented as a horse race, and the present system is indeed particular adapted to gaming activities centred around televised live action sporting events. However, as will be understood, the present system may equally used to permit gambling in relation to other events, such as casino-type games, as well as computer generated games, pre-recorded events etc.

[0070] The system further comprises a central gaming computer means in the form of a gaming system server 4002, together with associated operating terminal or terminals 4003, adapted to generate odds, calculate winnings etc in relation to the gaming event. The gaming server 4002 is adapted to communicate with a receiver/decoder 2020 via the int rmediate communication server or servers 3022. The connection between the gaming server 4002 and communication server

3022 may be implemented by an X25 Transpac link or via a dedicated line. The network link for the server is indicated broadly at 4010.

[0071] As described above, th communication server 3022 communicates with the receiver/decoder 2020 by means of a telephone link using the in-built modem of the receiver/decoder.

[0072] The gaming server may be equally adapted to send information to the receiver/decoder 2020 via a satellite link, indicated broadly at 4011, by injection of information into the multiplexer 2004 for subsequent integration in the transmitted MPEG stream.

[0073] As will be understood, all communications from the receiver/decoder 2020 to the gaming server 4002 are via the receiver/decoder modem and communication server 3022. In the case of communications from the gaming server 4002 to the receiver/decoder 2020, the choice of communication channel and communication means (MPEG satellite transmission or communication server/modem connection) may depend on the nature of the information to be transmitted.

[0074] Typically, the satellite link 4011 will be used to send data or information that may be updated on a daily basis or which may be received by any number of receiver/decoders in the park (odds for tomorrow's races etc). In particular, the satellite link may be used to download the application that needs to be installed in the receiver/decoder to enable the receiver/decoder to function in the gaming system.

[0075] In contrast, the modem link 4010 may be preferred for data that changes on a minute-by-minute basis or that is specific to a particular user (results of last race, current state of the account of the user etc).

[0076] In addition to handling gaming activities resulting from bets placed via the receiver/decoder 2020, for example as programmed in using the remote control 2044, the gaming server 4002 may also be adapted to manage bets to be placed by other input means, for example as placed by a phone service or as received by a "Minitel" type system, as used in France and other countries.

[0077] The gaming system server 4002 is additionally connected to a bank server network 4003 comprising one or more bank servers 4005, 4006. The bank server network may correspond to an existing network used to handle electronic payment transactions. The level of security and encryption in the communications between each of the elements of the gaming system will be described in more detail below in relation to the operation of the system.

Gaming System Operation

[0078] As mentioned in the introduction of the present application, gaming systems used in interactive television systems proposed to date have tended to use relatively laborious methods for settling accounts between the viewer and the central gaming authority, requiring

th viewer either t pay by a conventional method (cheque, telephone credit transfer etc) or to physically purchase an "electronic purse" in the form of a smart card or key containing a number of pre-paid credits that may be gambled.

[0079] The present embodiment differs from such systems in proposing a system architecture that enables a viewer to pay by means of a credit or debit card inserted in the decoder and by entering data into the system by means of the hand-held remote control. As mentioned above, the provision of a decoder provided with two distinct card readers 2030, 2031 enables the decoder to simultaneously hold a subscription card containing the viewers access rights (eg to the gaming channel) as well as interacting with a credit/debit card inserted in the decoder.

[0080] In order to comply with regulations concerning the use of credit/debit cards in gambling transactions, two different types of transactions need to be distinguished: (i) opening or re-crediting an account managed by the gaming system server and (ii) gambling the sums in this account.

Opening an account

[0081] In the present case, the card reader 2031 functions in a similar manner to a standard card reader used in banking terminals and the like to read and write data on a smart card presented in the reader. As with all card readers used in the banking field, communication between the terminal (in this case the decoder) and external servers is prohibited during the time that the card is being accessed by the terminal, i.e. for the time that the memory zones on the card are "open".

[0082] In order to open and credit an account with the gaming system server, the following steps are carried out during a first phase:

a) Using the handheld remote control, and as guided by the application loaded in the receiver/decoder, the user selects the option "open an account" and enters the sum of money that he wishes to transfer to this account.

b) After having introduced his credit card into the card reader slot 2031, the viewer is invited to enter his personal PIN code. The user has a maximum of two opportunities to enter the code, after which the receiver/decoder will refuse to accept any further entries and the transaction will be abandoned.

Note that in the case of sensitive information communicated to the receiver/decoder by the handset (in particular the PIN code) the data entered by the user on the key pad of the handset may be scrambled before transmission between the handset and decoder so as to prevent interception of this information by any third party. See above.

c) Assuming the code is correct, the smart card downloads certain information in response to a request from the receiver/decoder, including details of the last transactions, to enable the decoder to verify that the sum of transactions during a certain period is within, for example, the transaction limit of the card holder for that period.

d) The receiver/decoder then passes to the smart card information regarding the current transaction including the amount of the transaction, the date and time of the transaction, the details of the bank account to be credited in the transaction and so on. (The details of the account to be credited can be obtained by the decoder prior to the interrogation of the card from the gaming system server or the intermediate communications system server).

e) In the conventional manner, the smart card then calculates a first numeric certificate using this information, which is communicated to the receiver/decoder. The receiver/decoder writes the present transaction in the card and a second numeric certificate is calculated and communicated to the receiver/decoder. The memory zones of the smart card are then closed off.

The generation of a pair of numeric certificates is a specific security measure associated with the use of a receiver/decoder as transaction terminal.

Once the above steps have been carried out, the system then moves to a second phase involving communication between the receiver/decoder 2020, the intermediate communication server 3022 and the bank server 4005.

f) Before transferring any information, the receiver/decoder 2020 verifies the identity of the communication server 3022 by means of a public/private key system (eg using the RSA algorithm). In particular, the receiver/decoder generates a random number, which is transmitted to the server for encryption by a private key and returned to the receiver/decoder, which checks the encrypted value using the equivalent public key.

A simple handshake signal may also be provided by the decoder 2020 to identify itself to the server 3022.

g) Assuming the identity of the communication server is verified, the receiver/decoder 2020 sends to the communication server 3022 the details of the transaction to be carried out, including the first and second numeric certificate generated by the smart card.

h) The communication server 3022 then sends the transaction details to the first bank server 4005, which verifies the account of the user, and author-

ises (or not) the transaction and sends an acknowledgement of the transaction to the communication server. The transfer of money betwe n the user's account and that of the central gaming authority will then be handled within the bank network 4004.

i) Once the communication server 3022 has received acknowledgement of the acceptation of the monetary transfer, a message will be sent to the receiver/decoder 2020 of the completion of the transfer and the operation will proceed to the next phase.

Note that the same steps a) to i) as used in the first two phases will also be carried out in the event that the user wishes to increase the credit in an existing gaming account.

The next phase in the opening of a gaming account involves communication between the receiver/decoder 2020, the communication server 3022 (and the SAS and SMS servers 3002, 3004) and the gaming server 4002. The information communicated between these servers is largely non-sensitive and may be communicated in clear, with the exception of the code word chosen by the user to obtain access to his gaming account.

j) Using the information (name, address etc) on the user held in the SAS and SMS servers 3002, 3004, the communication server prepares a request for opening of an account with the gaming system server 4002. This information has been gathered in the SMS server during the original procedure carried out when the user originally subscribed to the television service. The user is thus spared the inconvenience of repeating all this information when subscribing to the gaming service.

Note that in the event that SMS database reveals, for example, that the subscriber is in debt with the television service, the communication server may abort the opening of an account with the gaming service. This extra verification step may be carried out earlier, for example, at step g).

k) In one embodiment, the communication server 3022 may send the subscriber information to the receiver/decoder 2020 where it is displayed on the television 2022 for verification by the user. Once verified, the information is sent to the gaming system server 4002 where a gambling account is created by the server 4002.

l) The account information (account number etc) is then sent from the gaming server 4002, via the communication server 3022, to the receiver/decoder 2022. The user is then invited to choose a suitable code word for the account which will be demanded by the system at every pening of a gaming session. As for the PIN number, the infra-

red signal containing this information and sent between the remote control and the decoder may be scrambled by the remote to avoid interception and descrambled by decoder.

m) The code word is then encrypted by a public key of a public/private key pair held in the receiver/decoder 2020 and sent to the communication server 3022, where It Is decrypted by the corresponding private key. In this case, for example, the same RSA key pair as used for the verification of the communication server may be used.

n) The code word is then re-encrypted by the communication server 3022 and sent to the gaming system server 4002 where it is decrypted and assigned to the user's account. In this case, a symmetric key algorithm, such as DES, may be advantageously used, for example, to permit two-way encrypted communication between the communication server 3022 and gaming server 4002.

Gambling with an existing gaming account

[0083]   Once the user has set up and credited a gaming account with the gaming server 4002, all future gambling transactions will be handled between the receiver/decoder 2020 and the gaming system server 4002. At the start of every gaming session, the system server 4002 will demand the user's assigned code word, which will be communicated between the receiver/decoder and the gaming server, via the communications server, as described above.

[0084]   For simplicity, and in order to permit a relatively rapid dialogue, all questions and responses between the user and the gaming system in order to place a bet and receive the results are preferably passed via the telephone/modem link and the communication server 3022. Certain data, such as the format of the screens displayed by the receiver/decoder in gaming mode and/or slowly changing or universal data (details of that day's races, the horses taking part etc) may be passed via the satellite uplink in order to take advantage of the bandwidth of this channel.

[0085]   Other embodiments, in which data is shared between the two communication channels in alternative ways may nevertheless be envisaged, for example, where all communication from the receiver/decoder to the gaming system server passes via the modem link, whilst all communications from the server to the receiver/decoder pass via the satellite link.

[0086]   As mentioned above, the present system may be used with a number of interactive gaming applications, for example, with computer games such as black-jack, poker or the like, in which the user places a bet on the outcome of a game managed by the gaming server. However, in view of the use of television broadcast technology, the system is particularly adapted to permit

gaming in r lation to liv acti n sporting ev nts, such as televised horse, dog or camel racing.

[0087] Figure 5 is a flow diagram of the steps involved in the placing f a bet in relation to one or more broadcast hors races. In the present case, the bet is to be placed in respect of the present day's races, i.e. in "real time", and the odds quoted for the horses may depend on the time at which the bet is taken. In alternative embodiments, bets may be placed the day or week before the race or races in question.

[0088] Firstly, at step 5000, the user enters his code word and opens a betting session. At steps 5001 and 5002, he chooses the racecourse he is interested in and one of the races running at that racecourse, respectively. Depending on which race is running, the user may be offered a number of different standard types of bet, from a simple bet to more complex bets, including main and side bets.

[0089] As will be appreciated, the bet types offered may be determined according to the wishes of the gaming authority and may be based on any of the usual types of bet offered for an event of this type.

[0090] At step 5003, the user chooses the type of bet he wishes to place. In the case of a simple bet on one horse, the next step will be step 5004 where the user chooses the formula of the bet, ie whether the horse will win or be placed in the first three or four positions. At step 5005, the user chooses the horse he wishes to bet on.

[0091] In the case of a complex bet, the user then chooses from a combination of win, place or win/place at step 5007 and from one of a number of types of bet (single, combined, reduced field, full field) at step 5007. The user may decide, for example to choose one horse to win and/or one horse to be placed in the top three or four. Other combinations may be made presented to reflect the choice of bet normally available. At step 5008 the user chooses the horses he wishes to bet on.

[0092] At step 5009 the user chooses his stake, i.e. the sum to be extracted from the money deposited in his gaming account. At step 5010 confirmation of the stake to be gambled is demanded. At this time, the system may also indicate the overall odds for the bet or bets placed and the sum of money to be won. Assuming that the user confirms the bet, the bet is registered at step 5011.

[0093] Following the results of the race, the gaming system server calculates the winnings or losses for the user. These will be subtracted or added automatically to his gaming account. The user may demand at any time the position of his account.

[0094] In the event that the user eventually wishes to close the account or to transfer some of his winnings to his bank account, a message to this end may be sent by the user from the receiver/decoder 2020 to the gaming system server 4002 (Figure 4). At that time, the server 4002 will communicate with the bank server 4006 to organise a credit transfer to the user's bank account.

Since th identity and bank details of the owner of the receiver/decoder are already known, the server will only transfer money from the gaming account of the user to the bank account originally used in the setting up of the gaming account.

[0095] It will be understood that the present invention has been described above purely by way of example, and modifications of detail can be made within the scope of the invention.

[0096] Each feature disclosed in the description, and (where appropriate) the claims and drawings may be provided independently or in any appropriate combination.

[0097] In the aforementioned preferred embodiments, certain features of the present invention have been implemented using computer software. However, it will of course be clear to the skilled man that any of these features may be implemented using hardware. Furthermore, it will be readily understood that the functions performed by the hardware, the computer software, and such like are performed on or using electrical and like signals.

Claims

1. An interactive gaming and audiovisual transmission system comprising a central gaming computer means for processing gaming data, a decoder adapted to receive gaming data from the central gaming computer together with transmitted audiovisual data, the decoder further including a card reading device for interacting with a user's bank card in order to credit a gaming account held by the central gaming computer means in response to a transfer of credit from the user's bank account.

2. An interactive gaming and audiovisual transmission system as claimed in claim 1, in which the decoder is equipped with a card reading device in the form of a smart card reader.

3. An interactive gaming and audiovisual transmission system as claimed in claim 1 or 2, in which the decoder is further equipped with a second card reading device

4. An interactive gaming and audiovisual transmission system as claimed in any preceding claim in which the decoder is adapted to obtain transfer of credit information in the form of an electronic certificate generated by the bank card in response to transaction data submitted by the decoder.

5. An interactive gaming and audiovisual transmission system as claimed in any preceding claim in which the decoder is provided with a handheld remote control, some or all of the data sent to the decoder being encrypted by the handheld remote

control and subsequently decrypted by the decoder.

6. An int ractive gaming and audiovisual transmission system as claimed in any preceding claim in which the decoder is adapted to transmit transfer of credit information from the decoder to a bank server via a network communication link.

21. A gaming system as claimed in Claim 19 or 20, adapted to communicate with the decoder and the bank server via a communications server.

22. A gaming system as claimed in Claim 21, adapted to receive encrypted information from the communications server.

23. A gaming system as claimed in any of Claims 19 to 22, adapted to transmit gaming data related to a real-time sporting event.

24. An interactive gaming and audiovisual transmission system comprising a gaming system as claimed in any of Claims 19 to 23, said user's decoder, and said bank server.

Fig.1.

Fig.2.

Fig.3.
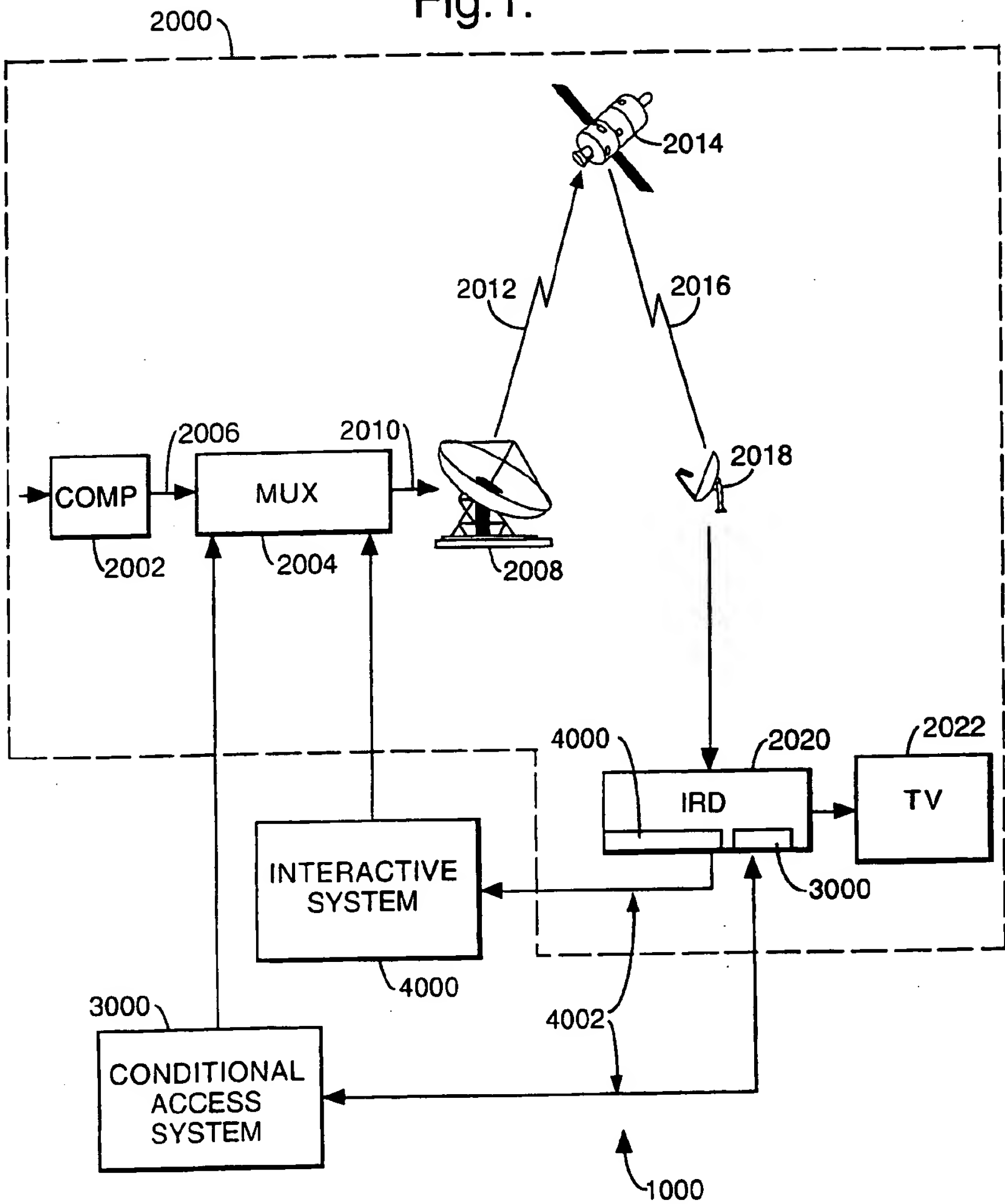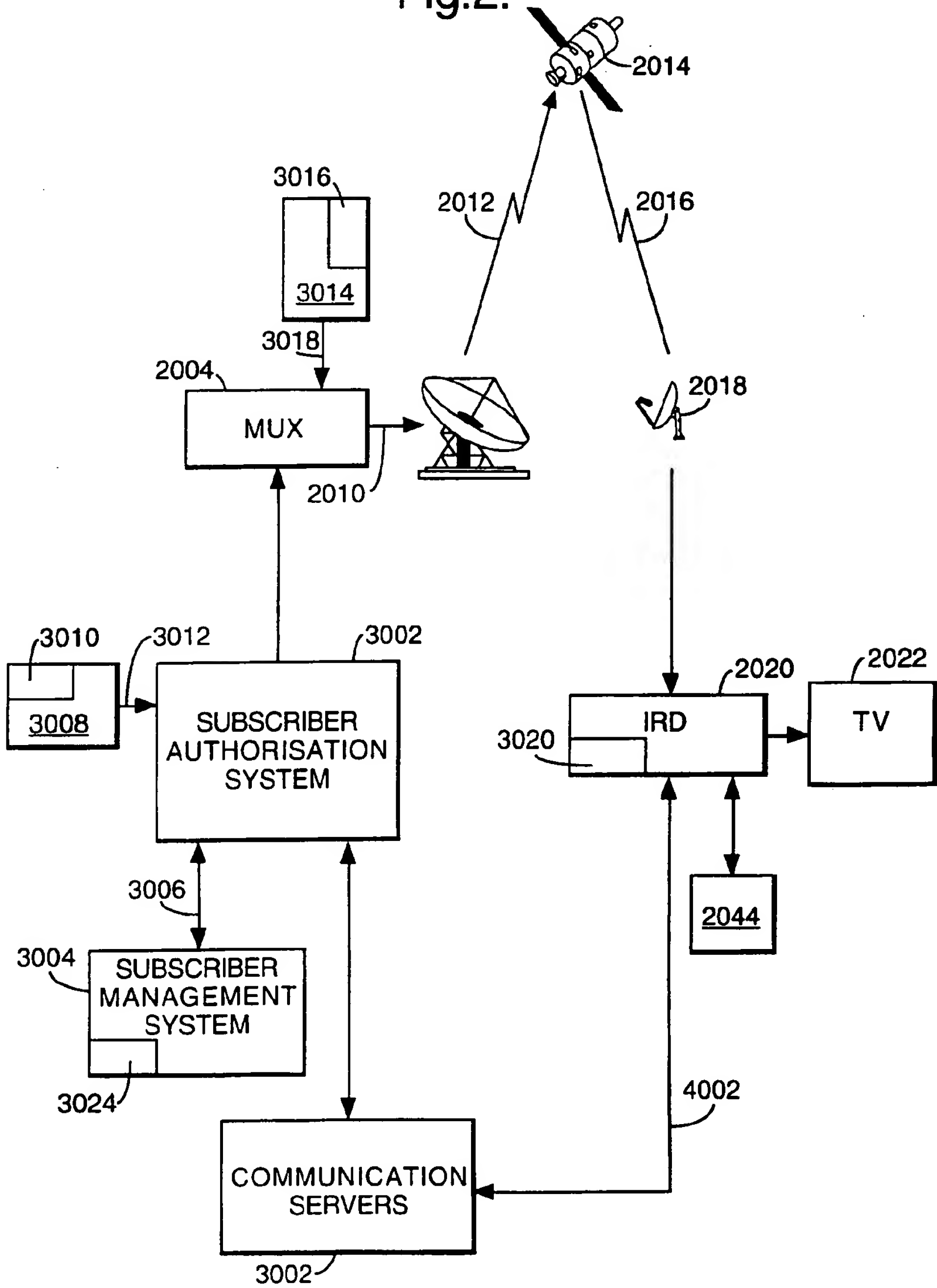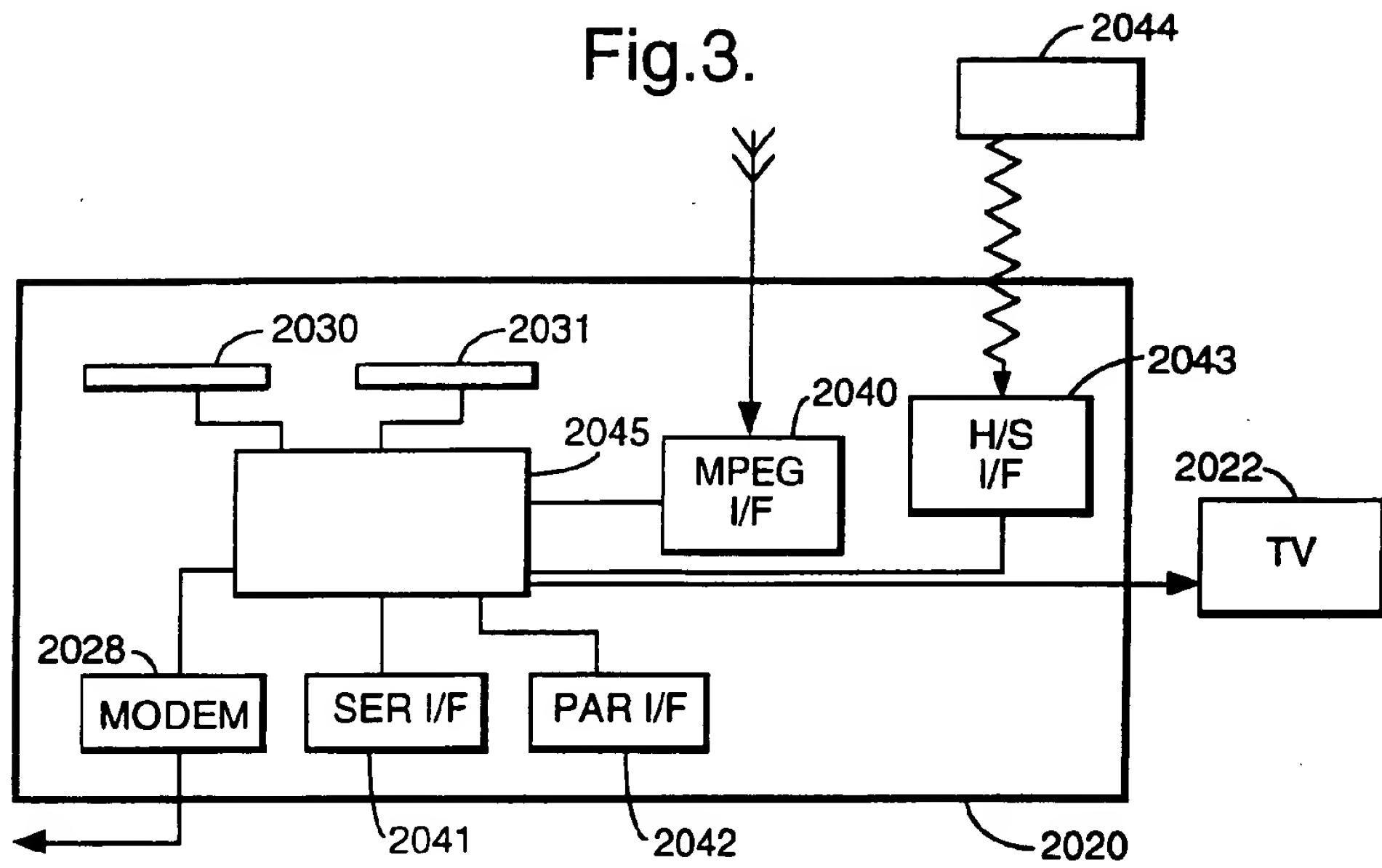
Fig.4.

Fig.5.

```
┌─────────────┐  5000
│    OPEN     │
│  SESSION    │
└──────┬──────┘
       │
┌──────┴──────┐  5001
│   CHOOSE    │
│  RACECOURSE │
└──────┬──────┘
       │
┌──────┴──────┐  5002
│   CHOOSE    │
│    RACE     │
└──────┬──────┘
       │
┌──────┴──────┐  5003
│   CHOOSE    │
│ BET  NUMBER │
└──────┬──────┴──────────────┐
       │                     │
┌──────┴──────┐  5006   ┌────┴────────┐  5004
│   CHOOSE    │         │   CHOOSE    │
│   FORMULA   │         │   FORMULA   │
│   1 WIN     │         │   1 WIN     │
│   2 PLACE   │         │   2 PLACE   │
│   3 WIN/PLACE│        └────┬────────┘
└──────┬──────┘              │
       │                     │
┌──────┴──────┐  5007        │            5005
│ CHOOSE TYPE │              │       ┌─────────────┐
│  1 SINGLE   │              └───────┤   CHOOSE    │
│ 2 COMBINED  │                      │   HORSE     │
│      •      │                      └─────┬───────┘
│      •      │                            │
│      •      │                            │
└──────┬──────┘                            │
       │                                   │
┌──────┴──────┐  5008                      │
│   CHOOSE    │                            │
│   HORSES    │                            │
└──────┬──────┘                            │
       │                                   │
┌──────┴──────┐                            │
│   CHOOSE    ├────────────────────────────┘
│   STAKE     │  5009
└──────┬──────┘
       │
┌──────┴──────┐
│ CONFIRMATION│
│  BY  USER   │  5010
└──────┬──────┘
       │
┌──────┴──────┐
│ BET  PLACED │
└─────────────┘  5011
```
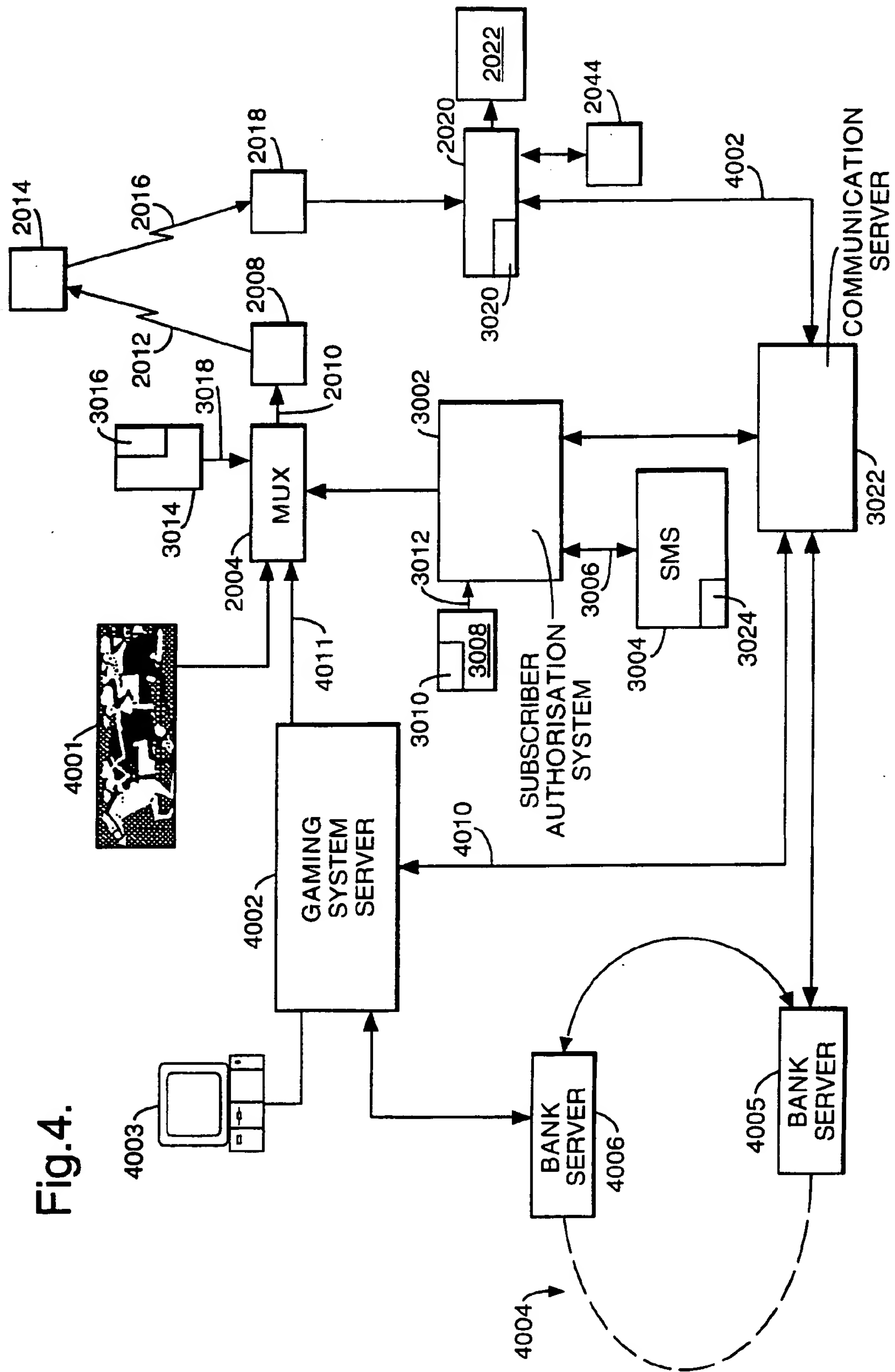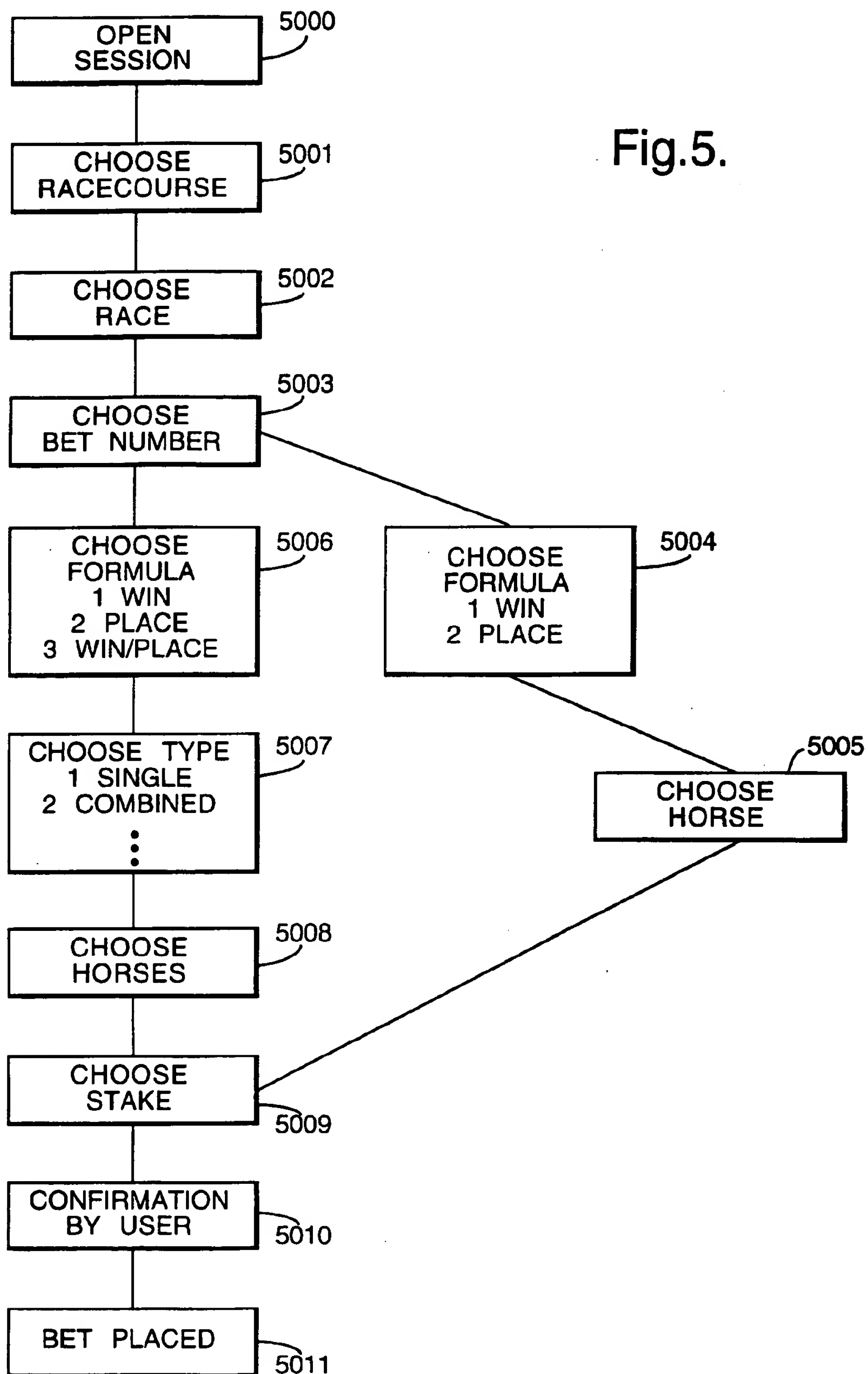
European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 98 40 0285

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X Y A	US 5 539 822 A (LETT DAVID B) 23 July 1996 * column 7, line 13 - line 33 * * column 9, line 58 - column 10, line 11 * * column 11, line 22 - line 42 * * column 15, line 11 - line 44 * * column 18, line 44 - column 20, line 33 * * figures 3E,3I *	1-3,10, 12, 15-19,23 4-9,11, 14,20, 21,24 5	A63F9/22
X	US 4 815 741 A (SMALL MAYNARD E) 28 March 1989 * column 4, line 41 - column 5, line 5 * * column 5, line 27 - line 38 *	1,19	
Y A	US 5 634 848 A (TSUDA YOICHIRO ET AL) 3 June 1997 * column 1, line 42 - line 64 * * column 3, line 6 - column 4, line 2 * * column 8, line 44 - column 9, line 21 *	6-9,14, 20,21,24 1,19	TECHNICAL FIELDS SEARCHED (Int.Cl.6) A63F H04N G07F G06F
Y	WO 95 01060 A (LINCOLN MINT HONG KONG LTD) 5 January 1995 * page 1, line 19 - line 29 * * page 3, line 17 - page 4, line 35 * * page 12, line 36 - page 13, line 35 * * page 14, line 31 - page 15, line 2 * * page 18, line 22 - line 27 * * page 20, line 8 - line 17 * * page 27, line 21 - page 28, line 6 * * page 29, line 4 - line 23 * * page 40, line 13 - page 42, line 2 *	4,5,11	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	26 August 1998	Sindic, G

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